

REMARKS

Status of the Application

Prior to entry of this response, claims 16-20 were withdrawn, and claims 22-24, 27 and 28 were pending examination. Claims 21, 25 and 26 were previously canceled. In this response, no claims are amended, added, or canceled. Therefore, claims 22-24, 27 and 28 remain pending for examination.

Claims 22-24, and 27 stand rejected under 35 U.S.C. §102(e) as anticipated by the cited portions of U.S. Pat. No. 5,788,778 (“Shang”). Claim 28 stands rejected under 35 U.S.C. §103(a) as unpatentable over Shang.

Reconsideration of the application in light of the remarks below is respectfully requested.

Remarks

Claim 22

Claim 22 stands rejected as being anticipated by Shang. Applicant respectfully traverses this rejection at least because Shang does not teach all of the recitations of claim 22.

Claim 22 recites, in part,

“[a] method of removing residue from a substrate processing chamber, said method comprising the steps of:

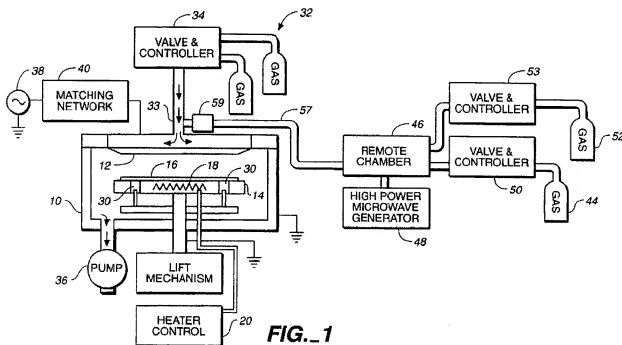
forming a plasma remotely with respect to said chamber, said plasma including a plurality of reactive radicals; ...

forming a nonplasma diluent gas flow, wherein said nonplasma diluent gas flow comprises at least one of an inert gas or a reduction gas; [and]

mixing said flow of said reactive radicals and said diluent gas flow at a mixing location downstream of a location of forming said flow of

said reactive radicals and anterior to said chamber to form a gas-radical mixture[.]” (emphasis added)

The Office Action cites to Figure 1 of Shang, as well as the discussion thereof, as teaching the above recitations. Figure 1 of Shang is reproduced below for the Examiner’s convenience:



Regarding the system of Shang, the Office Action states on pages 2 and 3 that (1) the processing chamber is element 10, (2) the plasma is formed remotely at element 46, (3) the nonplasma diluent gas flow of inert gas or reduction gas is provided at elements 32 and 34, and (4) that the mixing of the plasma and the diluent gas occurs at the junction at element 33.

However, nonplasma diluent gas flow is not provided at elements 32 and 34. Elements 32 and 34 of Shang provide deposition gases. There is no discussion in Shang of inert or reduction gases being provided at elements 32 and 34. The pertinent portion of Shang which discusses elements 32 and 34 is reproduced below for the Examiner’s convenience:

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Outside of chamber 10, there is a gas supply 32 containing the gases that are used during deposition. The particular gases that are used depend upon the materials are to be deposited onto the substrate. The process gases flow through an inlet port into the gas manifold and then into the chamber through the shower head. An electronically operated valve and flow control mechanism 34 controls the flow of gases from the gas supply into the chamber. Also connected to the chamber through an outlet port is a vacuum pump 36, which is used to evacuate the chamber.

Instead, Shang provides nonplasma diluent gas flow from element 52, and plasma precursor from element 44, meaning that the mixing of the nonplasma filuent gas flow and the plasma occurs in the remote chamber (element 46), and not downstream of the remote chamber as recited in claim 22. The pertinent portion of Shang which discusses this process is reproduced below for the Examiner's convenience:

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The valve and flow control mechanism 50 delivers gas from the source of precursor gas 44 into the remote activation chamber 46 at a user-selected flow rate. The power source 48 activates the precursor gas to form a reactive species which is then flowed through the conduit 57 into the deposition chamber via inlet port 33. In other words, the upper electrode or shower head 12 is used to deliver the reactive gas into the deposition chamber. In the described embodiment, the remote chamber is a sapphire tube and the power source is 2.54 GHz microwave energy with its output aimed at the sapphire tube.

Optionally, there may also be a source of a minor carrier gas 52 that is connected to the remote activation chamber through another valve and flow control mechanism 53. The minor carrier gas aids in the transport of the activated

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species to the deposition chamber. It can be any appropriate nonreactive gas that is compatible with the particular cleaning process with which it is being used. For example, the minor carrier gas may be argon, nitrogen, helium, hydrogen, or oxygen, etc. In addition to aiding in the transport of activated species to the deposition chamber, the carrier gas may also assist in the cleaning process or help initiate and/or stabilize the plasma in the deposition chamber. 5

Therefore, Shang does not teach "mixing said flow of said reactive radicals and said diluent gas flow at a mixing location downstream of a location of forming said flow of said reactive radicals" as recited in claim 22. Because Shang does not teach such a recitation, Shang does not teach or suggest all of the recitations of claim 22. Consequently, Shang cannot anticipate claim 22. Therefore, Applicant respectfully requests withdrawal of the §102 rejection of this claim.

Claims 23, 24, 27 and 28

Claims 23, 24 and 27 stand rejected as being anticipated by Shang. Claim 28 stands rejected as being obvious over Shang. Each of these claims depends from claim 22, and is therefore believed to be allowable at least by virtue of its dependence from an allowable base claim. Therefore, Applicant respectfully requests withdrawal of the §102 and §103 rejections of these claims.

CONCLUSION

For at least all of the foregoing reasons, Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

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Amdt. dated March 5, 2008
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PATENT

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



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